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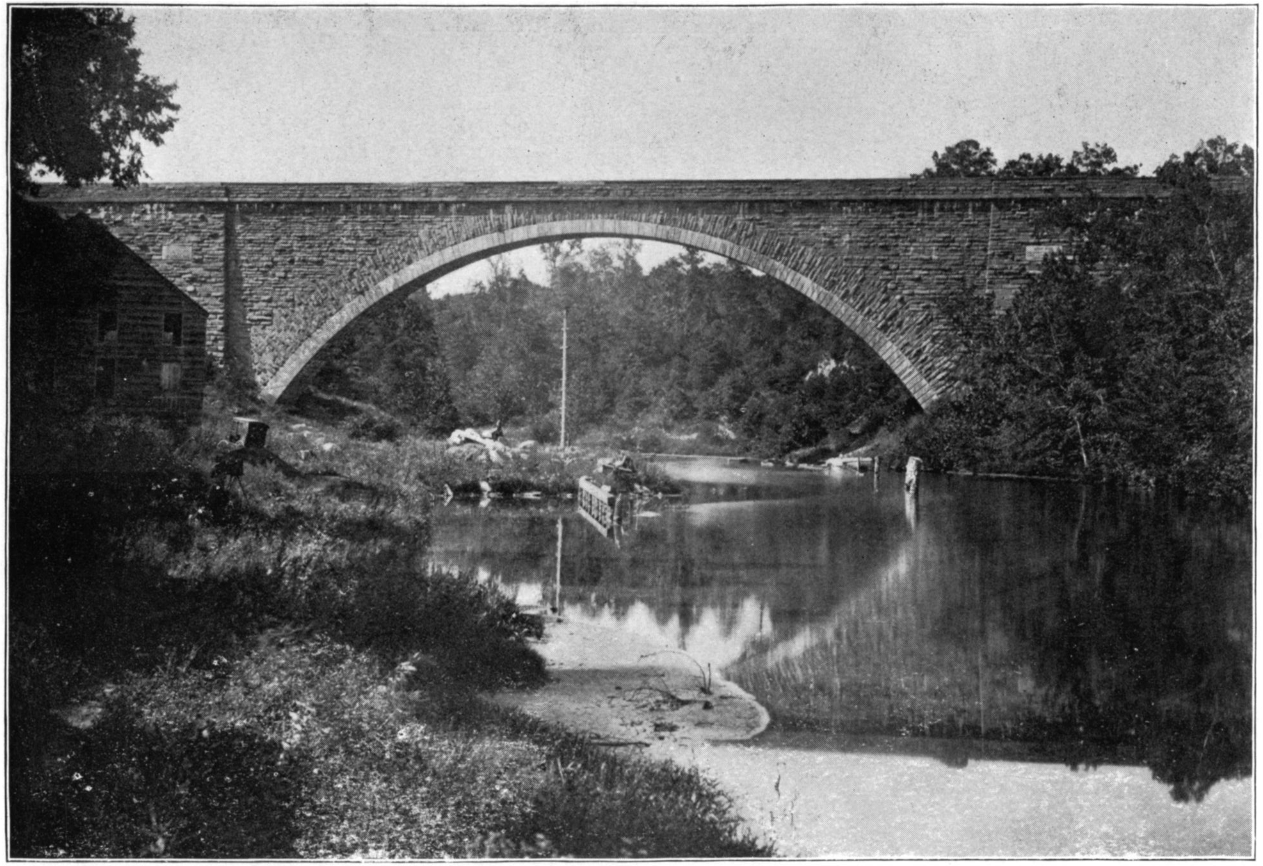


Condition During the Years 1868-'69, before the Parapet Walls were Constructed.

CABIN JOHN BRIDGE.

By Mr. William T. S. Curtis.

[Read before the Society November 1, 1897.]

The subject of the construction of the Washington Aqueduct has been given considerable prominence lately by reason of the very able and comprehensive paper presented by Captain D. DuB. Gaillard, Corps of Engineers, U. S. A., at the field meeting of the National Geographic Society held October 2d of this year. Much interest has been revived as to this subject, particularly concerning the history of the construction of "Union Arch," familiarly known as Cabin John Bridge, which spans, with a single massive arch of masonry, Cabin John run or creek, in a deep ravine a few miles above the city.

The fact that in our midst exists one of the most imposing and wonderful structures which engineering skill could devise, appears not be known to, or at least appreciated by, the people of our city or the hosts of visitors and sightseers who come to Washington.

The initiatory step in the matter was taken on April 21, 1852, when Congress, in the appropriation act of that date, inserted the following provision:

> "To enable the President to cause the necessary surveys, projects, and estimates to be made for determining the best means of affording the cities of Washington and Georgetown an unfailing and abundant supply of good and wholesome water, report thereof to be made to Congress at its next session, the sum of $5,000, or so much thereof as may be necessary." (10 Stat., 92.)

Following this, on March 3, 1853, an appropriation of $100,000 was made, the same to be expended under the direction of the President of the United States, for the purpose of bringing water into the city of Washington, upon such plan and from such places as he might approve (10 Stat., 206).

March 3, 1855, an appropriation of $250,000 was made for continuing the work (10 Stat., 664).

August 18, 1856, another $250,000 was appropriated (11 ib., 86).

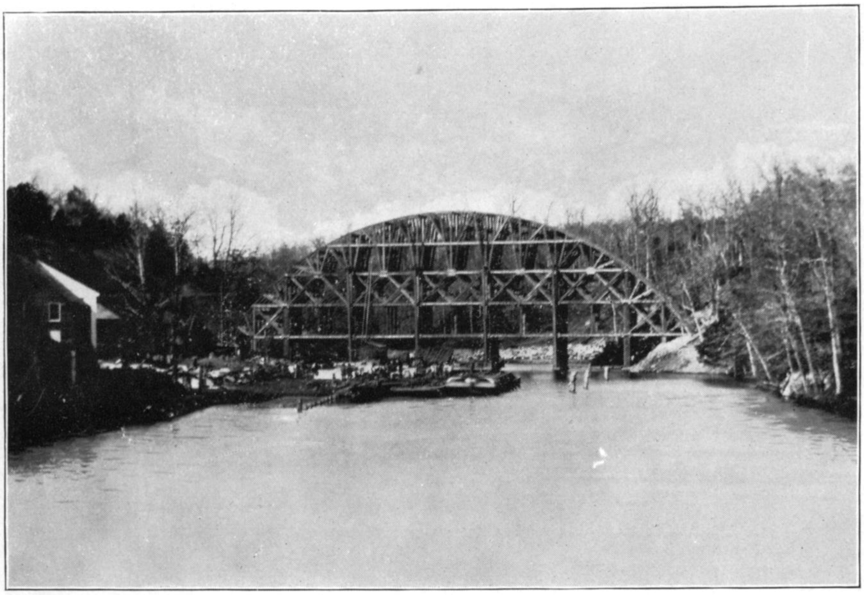
March 3, 1857, a further appropriation was made "for continuing Washington Aqueduct, $1,000,000" (ib., 225), and on June 12, 1858, $800,000 additional was appropriated (ib., 323).

The act of March 3, 1859 (ib., 435), is a general law providing for the care and preservation of the works mentioned. No appropriation was made, but, among other things, it created the office of "Engineer of the Potomac Water-works."

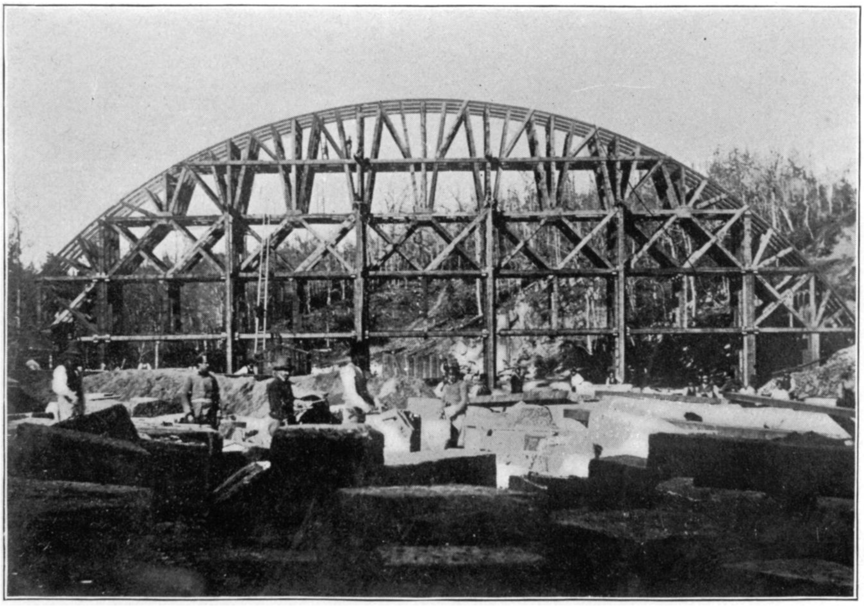
June 25, 1860, the following provision was embodied in the appropriation act of that date (12 ib., 106):

> "For completion of the Washington Aqueduct, $500,000, to be expended according to the plans and estimates of Captain Meigs and under his superintendence: *Provided,* That the office of engineer of the Potomac water-works is hereby abolished, and the duties shall hereafter be discharged by the chief engineer of the Washington Aqueduct."

The day following the approval of the appropriation act last above mentioned, President Buchanan transmitted to Congress a message wherein he complained that the clause in said act providing that the money should be expended under the superintendence of Captain Meigs was an interference with the prerogatives and rights of the President "to be Commander-in-Chief of the Army and Navy of the United States," as it virtually directed that the money could not be expended unless Captain Meigs superintended its disbursement. The President contended that he still had the right, notwithstanding that clause, to send Captain Meigs



Appearance During the Winter of 1857-'58.



Showing General Character of the Work.

away from, Washington, to any part of the Union, to superintend the erection of fortifications or other public works.

Captain Montgomery C. Meigs had shown such marked ability in the conduct of this great undertaking that Congress, by the use of the language in the act, merely intended to thus express its approval of his labors, and that he continue in the charge thereof, but not in any wise to restrict the constitutional powers of the President. However, it is worthy of notice that a few days after the message mentioned, Captain Meigs was relieved of the charge of the aqueduct, and in July, 1860, he was ordered to Fort Jefferson, Tortugas, Florida, in connection with the public works at that place. He remained there but a few months, returning in February, 1861.

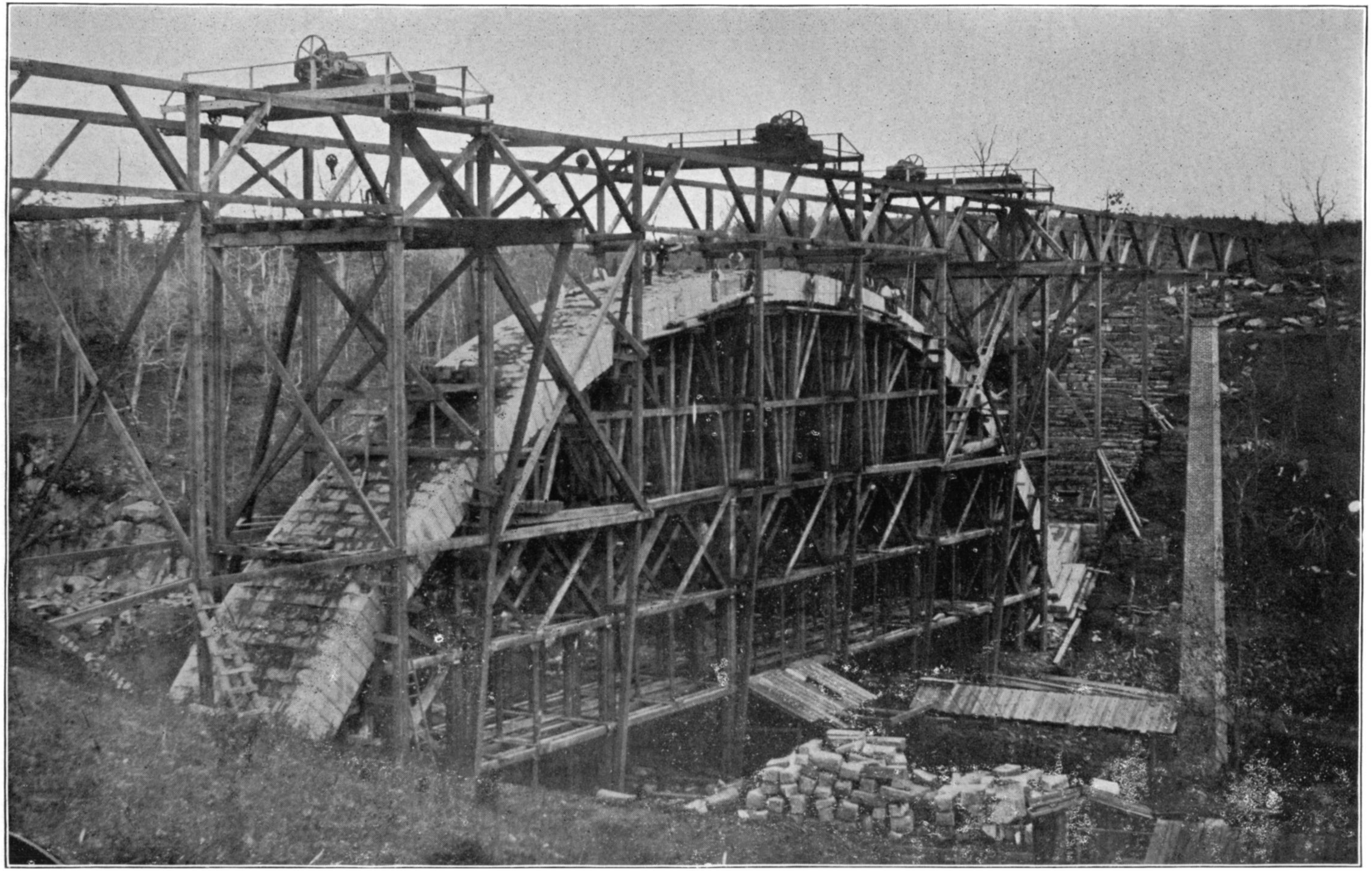
Captain Meigs assumed charge of the work at its inception, after the appropriation of $5,000 was made in 1852. The surveys, projects, and estimates for the general system of water supply for the city which is now in use, were prepared by him. (See his report of February 12, 1853, S. Ex. Doc. 48, 2d sess. 32d Congress.) Many difficulties arose in its construction—valleys had to be arched and hills required to be tunnelled in order to provide for the conduit; but the engineering genius and force of Captain Meigs was equal to the occasion.

The most serious obstacle encountered was at Cabin John run. The ravine was too wide and deep to fill, and the only solution was an aqueduct over the valley. At first it was decided to span it with a bridge of masonry supported on a series of piers and arches, at an estimated cost of $72, 409, considerably below the ultimate cost of the present structure. (See p. 26 S. Ex. Doc. 48, 2d sess. 32d Congress, *supra.*) Subsequently this plan was changed, and it was determined that the present magnificent affair should be constructed, to excel any structure of its kind on earth, and at the same time to be a lasting and imperishable monument to the genius of its engineer and to the possibilities of modern bridge building. To the day of his death, Captain Meigs was proud of his achievement.

Early in the year 1857, before any work had been done on the bridge or its foundations, he sought for a man possessed of practical experience in the construction of heavy masonry, to act as general superintendent and inspector, whose duty it should be to supervise the construction, to see to the progress of the work, and that all the many and complex details were carried out to the letter.

I may say, with pardonable pride, that my father, Mr. Charles T. Curtis, was selected by Captain Meigs to fill this important and responsible position. Mr. Curtis had had long experience and training under Col. Thayer in the building of Fort Warren, Boston Harbor, and afterwards in connection with the construction of the Boston Aqueduct. He took charge of the work early in 1857, and continued in his position until 1863, when the bridge was practically complete. He then went to New England, in connection with other public works, such as fortifications and sea-walls, and until his death, which took place in 1893, he was actively engaged upon public works of a similar character, having devoted a period of over 50 years of his life in the service of the Government. Much of the data I now relate relative to the bridge I have heard and obtained from his own lips, and from his papers now in my possession.

Although a small child at the time my father was in charge of the construction of the bridge, I remember quite distinctly the appearance of the work as it pro-



December 6, 1858, Two Days After the Arch was Keyed.

gressed, the host of workmen, and the mass of stone, lumber, and other material used in its construction. To see the completed bridge as it is to-day in all its beauty, the lovely valley and creek beneath, and the forest trees, one can scarcely realize the place of that day and the present to be the same.

In order to provide for the transportation by water of the stone and other material, a large dam was built across the creek a short distance above the Chesapeake and Ohio canal, and a lock was constructed at that point to permit boats to be floated into the pond, which, at that time, filled the valley beneath the bridge. Remains of the lock and dam can be seen to-day, and in place of the pond as it then existed a beautiful grove of trees has grown, changing the entire landscape.

The first work upon the bridge proper began early in 1857, and consisted in clearing away the underbrush and débris on the contemplated site of the structure as shown by the survey. The soil was removed until rock foundation was reached. This, in turn, was blasted away until the solid ledge of the hill was exposed. All disintegrated portions were removed, the surface smoothed off, and a proper face made for the reception of the arch by a hydraulic bed of cement and broken stone.

As the superstructure was to be very massive, it required a correspondingly heavy center or trestle to support it during construction. This trestle rested upon a series of stone piers, which piers still remain, and are now used as the support for a rustic foot bridge over the creek.

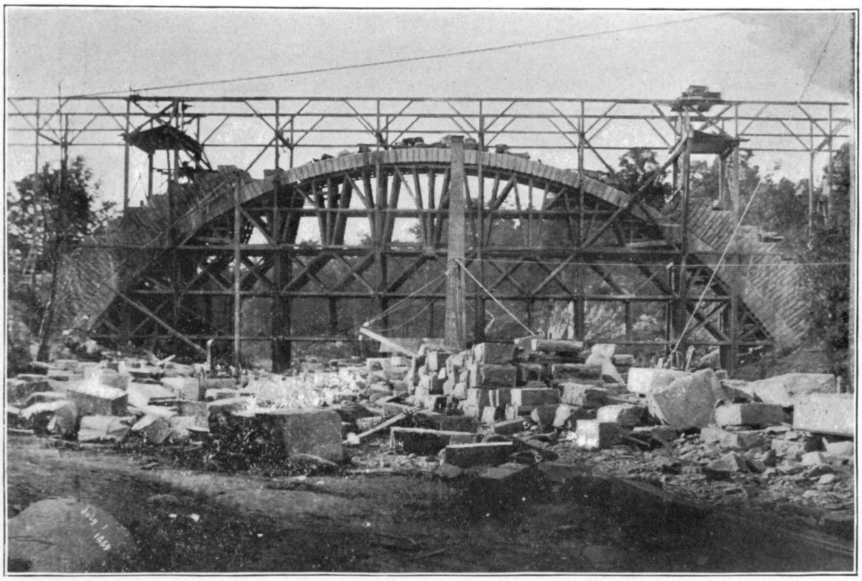
In addition to the main trestle a further framework was constructed to carry a system of traveling cranes, by which means the stone was transported to various portions of the structure as it was used. The remains of the piers carrying this framework for the cranes can also be seen in the valley, outside of the lines of the bridge.

The work was rapidly pushed, so that on December 4, 1858, the arch was keyed, and by July 1, 1859, the voussoirs, or arch stones, as well as a considerable portion of the abutments, were in position. As before stated, Captain Meigs was in charge of the bridge and the aqueduct from the date of the first survey, in 1852, until July 1860, when he was relieved by orders of the War Department, and Captain Henry W. Benham, Corps of Engineers, U. S. A., was placed in charge. Captain Benham remained in control but a very short time, and he in turn was succeeded by Lieutenant James St. C. Morton, of the same corps, who was subsequently killed during the siege of Petersburg, Va., on June 17, 1864.

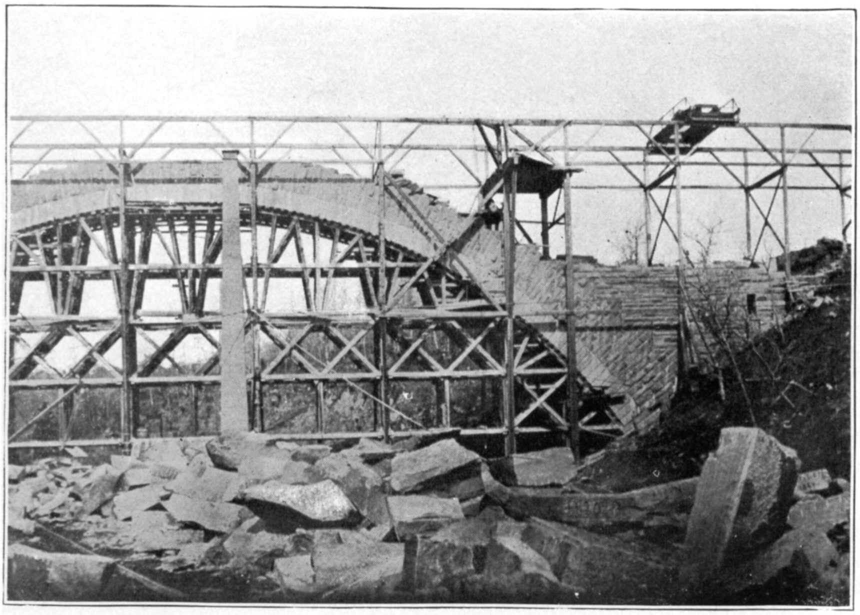
February 22, 1861, just before the breaking out of the Civil War and after an absence of only six or seven months, Captain Meigs returned from Fort Jefferson, and again assumed charge of the work on the bridge and aqueduct, and the same were practically completed by him as chief engineer.

At the breaking out of the war considerable anxiety was felt by those in authority lest the Confederates should set fire to the center or trestle, and so destroy the arch; and some time in May, 1861, the trestle was removed.

On account of the immense amount of business of the War Department by reason of the war, and to relieve that department of this extra duty, on June 18, 1862 (12 Stat., 620), Congress adopted a joint resolution transferring the supervision of the Potomac waterworks to the Department of the Interior, and directed



Showing the Progress of the Work on July 1, 1859.



Photograph taken February 27, 1861.

that the work should be completed under the direction and supervision of the Secretary of the Interior. It so remained until 1867, when it was again transferred to the War Department, where it is to-day, under the charge of the able engineer, Captain D. DuB. Gaillard.

On December 5, 1863, the water was turned into the aqueduct, but the bridge proper was not completed until the following year. While this was the first water passing through the aqueduct from the Potomac River at the Great Falls, yet on January 3, 1859, water was introduced into the city by means of small mains or supply pipes from the receiving reservoir above Georgetown.

The present parapet walls are built of red sandstone, from the quarries at Seneca on the Potomac, and were constructed in 1872–73. From 1864 until that time the only protection for teams and pedestrians was a low guard-rail of timbers or logs.

From about May or June, 1861, until July, 1862, a period of little over one year, active work upon the bridge ceased, owing to the Civil War then waging.

Caleb B. Smith, Secretary of the Interior, in his report to the President, November 29, 1862, speaking of the Potomac water-works, says:

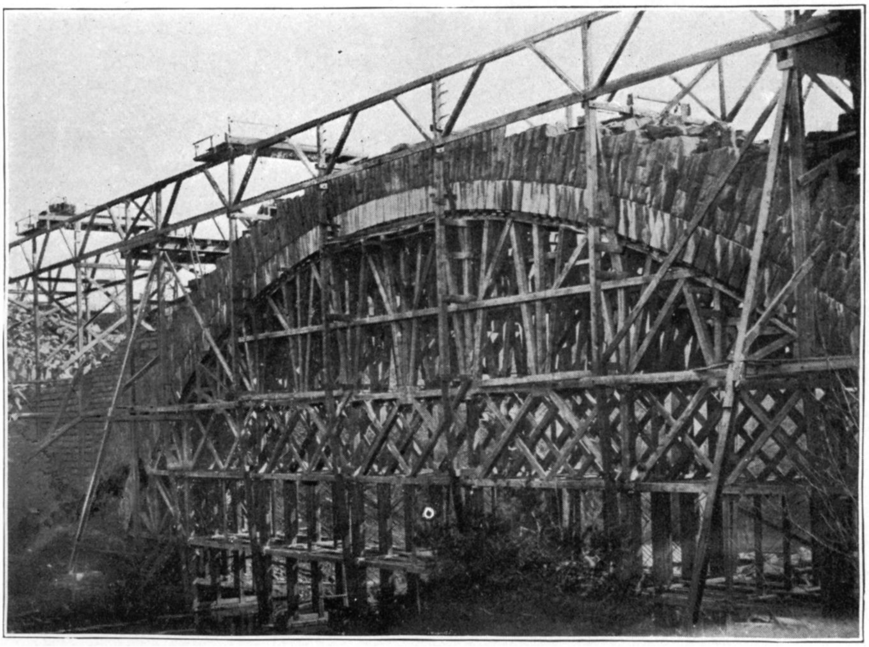
> "On the 15th of July last the supervision of this work was transferred from the War Department to this department, under the authority of a joint resolution of Congress. The work was suspended in the spring of 1861, and was not resumed until after its transfer to this department. Since that time the work has been in progress, and it is estimated that it may be completed by the 1st of July, 1863.
>
> * * *
>
> "All the work, which will be done under the direction of W. R. Hutton, Esq., the present engineer, will be in accordance with the plans of General Meigs, which have received the sanction of Congress."

In May, 1861, Captain Meigs became quartermaster-general, with his headquarters in Washington, and when the work was resumed in the summer of 1862, under the orders of the Secretary of the Interior, General Meigs ceased to have any further charge of the work, and Mr. William R. Hutton was thereupon appointed chief engineer, who held the position until July, 1863, when he was succeeded by Mr. Silas Seymour.

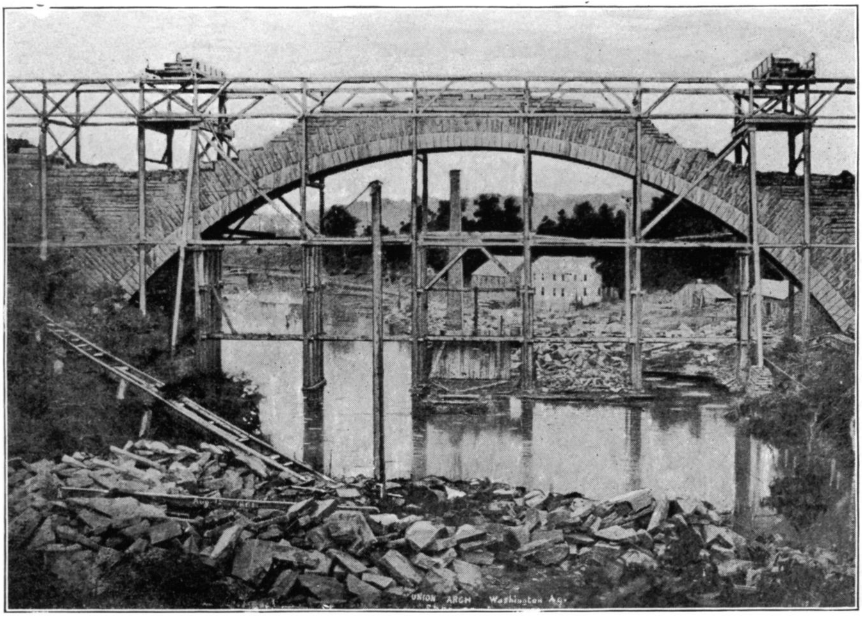
Mr. Seymour, in his annual report to Hon. John P. Usher, Secretary of the Interior, under date of October 1, 1863, says:

> "Before closing this report, I deem it proper as an act of justice to the gentlemen who have preceded me as engineer in charge of this great national work, as well as a matter of historic interest, to state that the Washington Aqueduct was originally projected upon its present general plan and location by Brigadier General Montgomery C. Meigs, now Quartermaster General of the United States Army; and that the work, so far as executed (with the exception of a portion of the dam in the Potomac, and the water facings of the distributing reservoir), has been done in accordance with the plans and specifications prepared by him and generally under his own supervision."

To-day this noble structure is without a rival on earth as far as an arch or span of masonry is concerned. It is 450 feet long over all, including the abutments. It has a single span of 220 feet, and a rise of 57.26 feet. The radii of the intrados and extrados of the granite ring are, respectively, 134.2852 feet and 143.2695 feet. It is 4.2 feet thick at the crown, 20.4 feet wide, and carries a brick conduit 9 feet in diameter. There are 11,914.18 cubic yards of masonry, 852.66 cubic yards of concrete, and 516 cubic yards of brickwork used in its construction. The cut stone arch, or ring, is of Quincy (Mass.) granite, shipped to Georgetown by vessels, and thence to the bridge by way of the canal. The rubble arch and spandrels are Seneca sandstone, and the abutments are gneiss from Montgomery county, Maryland. The arch stones are each 2 feet thick, 4.2. feet deep at the crown, and 6.2 feet at the springing line. The surface of the roadway is



Condition of the Bridge during the Spring of 1861, Showing the Massive Character of the Center.



August 12, 1861, Shortly after the Removal of the Center.

about 100 feet above the bottom of the ravine. The total cost of the bridge, including the parapet walls, was about $254,000. These figures are from the official records and reports.

History records one bridge or stone arch larger than Cabin John. It spanned the Adda, a tributary of the Po, at Trezzo, in northern Italy. The date of the construction of this bridge cannot be determined with accuracy. One authority states that it was constructed in the year A. D. 1380, by order of the Duke of Milan, and was destroyed by the Italian general Carmagnola in 1427. This bridge consisted of a single stone arch of granite, with a span of 251 feet, 31 feet more than that of Cabin John. It had a rise of 88 feet, and at the crown was only 4 feet thick. The name of the engineer is unknown. Prof. Ira O. Baker, in his *Treatise on Masonry Construction*, gives the same dates as to when the bridge was constructed and destroyed, and also the figures concerning its dimensions.

Within the last few years several large masonry bridges have been constructed in Europe, very similar in design to that of Cabin John. The most important of these is the Jaremcze railway viaduct over the river Pruth, in Galicia, on the line of the Austrian Stanislau-Woronienka railroad, having a single arch over the river of 65 meters span (213¼ feet), with a rise of 58 feet. It is built of sandstone, with a thickness of 6 feet 10½ inches at the crown and 10 feet 2 inches at the skewbacks, and is 14 feet 9 inches wide. The main arch consists of two thicknesses of dimension stones, which head into each other, while the spandrel arches are built of rubble masonry. It is stated to have cost only $40,400, due mainly to the low price of labor and the abundance of material in the immediate vicinity, such as the stone, and the timber used in the construction of the falseworks.

The Lavaur bridge in France, on the line of the Limoges and Brives Railway, is of the same general design as the Jaremcze structure. It has a single span of 61.50 meters (201¾ feet).

The largest span stone arch in Great Britain is the famous Grosvenor Bridge over the River Dee at Chester, England, having a span of 200 feet.

The Ballochmyle viaduct on the Glasgow and South Western Railway has a span of 180 feet.

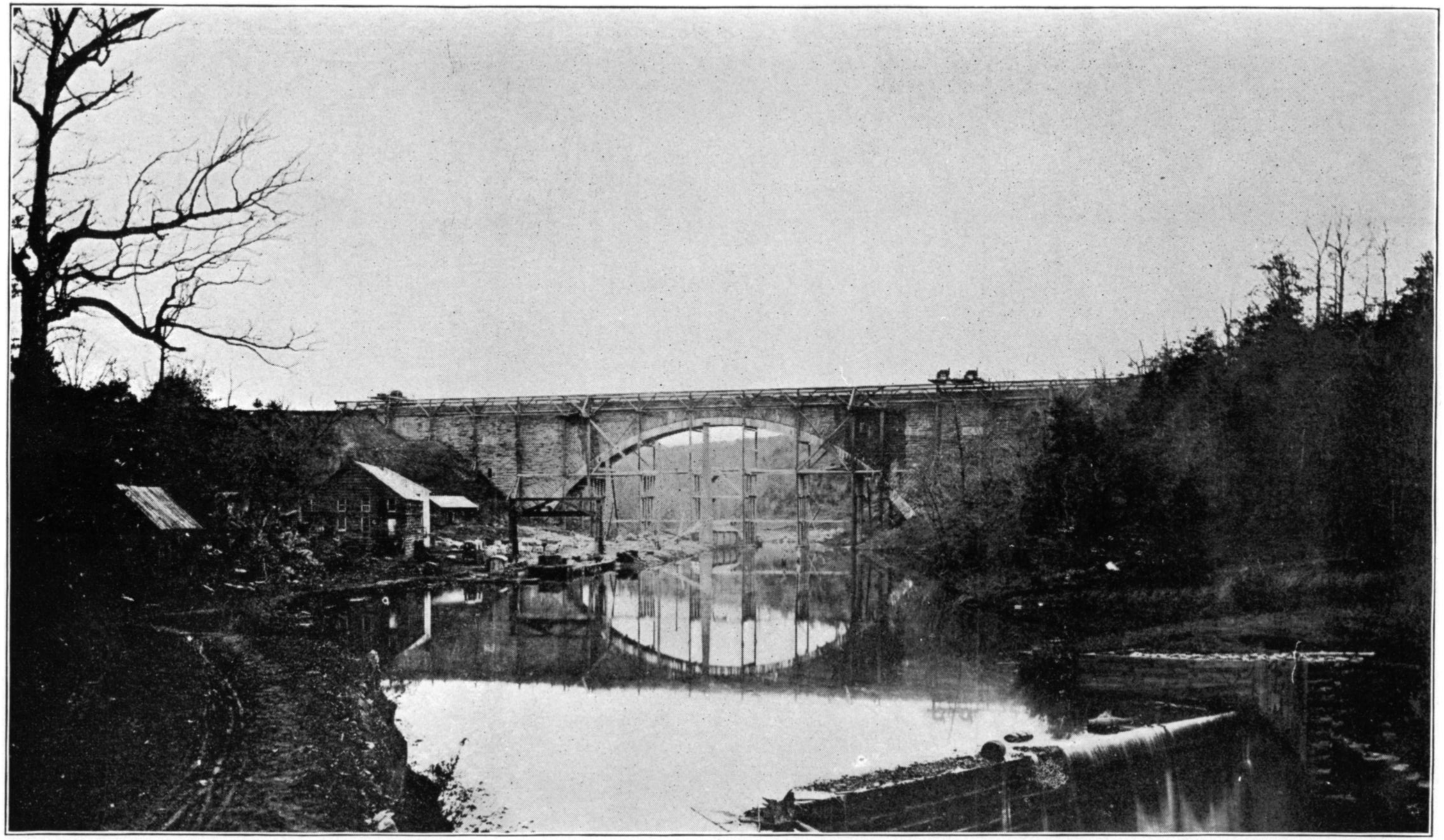
[See paper on Masonry bridges by Von Karl Von Leibbrand, Leipzig, 1897. Also Vol. 85, p. 63 of "Engineering," London, issue of January 21st, 1898; also Vol. 25, p. 852 Railroad Gazette (N. Y.), issue of Nov. 24th, 1893, and Vol. 27, p. 308, same publication, issue of May 17th, 1895.]

On p. 159 of Vol. 53, "Engineering," Feb. 5th, 1892, it is stated, referring to Cabin John Bridge, that, "this bridge is second only in span to the one over the Adda already referred to, and is, I believe, the longest span for a stone arch now standing."

See also article by Robert Jamison on Famous Bridges of the World appearing in Vol. 20, p. 553 Chautauquan 1894-95, wherein he says that nothing now remains of the Adda bridge at Trezzo, except a small portion of the arch.

All the authorities, however, agree that "Cabin John" stands to-day unrivaled, the nearest approach to it being the aforementioned bridge over the Pruth at Jaremcze, 6¾ feet less in span.

The working plans and drawings of Cabin John Bridge, as well as much of the detail work of that character up to the spring of 1861, which are now on file in the office of the Washington Aqueduct, and the War Department, appear to have been prepared and performed mainly by Mr. Alfred L. Rives, the assistant



December 5, 1863, the Day when the Water was First Turned into the Aqueduct.

engineer, who was a graduate of the *Ecole des Ponts et Chaussees* in Paris. At the breaking out of the Civil War Mr. Rives resigned his position, went south, and joined hands with the Confederacy, an act on his part which caused Captain Meigs to feel very much affronted, and which may account for certain orders of Captain Meigs referred to hereafter. I am informed that Mr. Rives is engaged in his profession somewhere in Central America, and possesses a very high reputation as an engineer. He is the father of Amelie Rives, the authoress.

After the resignation of Mr. Rives, in 1861, he was succeeded by Mr. William R. Hutton, and in 1862, when work was resumed under the direction of the Department of the Interior, Mr. Hutton became the chief engineer. At present he is a very prominent and successful civil engineer in the city of New York. The famous Washington Bridge over the Harlem river is but one of his productions.

Much has been said and written during late years concerning the erasure from the bridge of the name of Jefferson Davis, Secretary of War during the administration of President Pierce. At the time of the death of General Meigs, in 1892, several articles were published charging him with being the author of the erasure, and they called forth several denials from his friends. On September 8th of that year a card appeared in one of our local papers over the name of Mr. Hutton, which is of interest to note, coming, as it does, from one so intimately connected with the bridge at that time. He says:

"In June, 1862, at the request of the Secretary of the Interior, Hon. Caleb B. Smith, to whose department the aqueduct had just been transferred, I accompanied the Secretary and a number of Members of Congress on a tour of inspection of the aqueduct by way of the canal. Opposite Cabin John several of the party disembarked, and walked to the bridge for a nearer view. Returning in hot haste, 'Do you know', said Hon. Galusha Grow to the Secretary, 'that rebel Meigs has put Jeff. Davis's name on the bridge?' Turning to me, the Secretary said: 'The first order I give you is to cut Jeff. Davis's name off the bridge.' A few days later I was appointed chief engineer of the aqueduct. Not taking seriously the Secretary's remarks, I did nothing in the matter. A week later Mr. Robert McIntyre, the contractor, arrived to resume his work upon the bridge, and called to pay his respects to the Secretary. The Secretary said to him that they had put Jeff. Davis's name on the bridge, and he wished he would cut it off, 'With the greatest pleasure, Mr. Secretary,' was the reply, and the contractor's first work was to remove Mr. Davis's name."

Mr. Charles T. Curtis, who was superintendent and inspector at that time, has often stated to me that General Meigs had nothing whatever to do with the erasure mentioned, but that it was done by order of the Secretary, and the work of cutting out the name was performed by one of the stone-cutters then at work on the bridge.

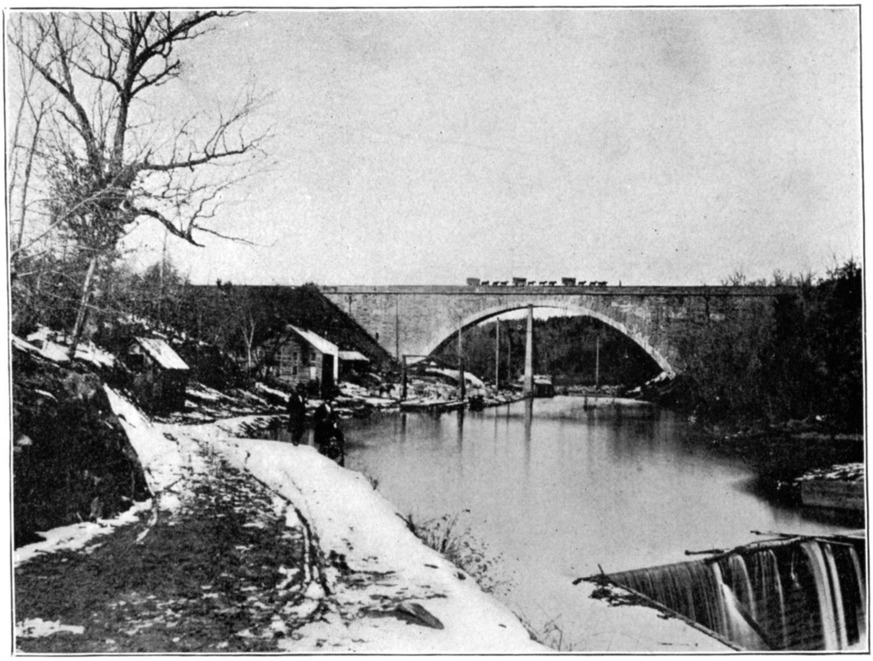
The inscription on the west abutment, above mentioned, showing the erasure of the name of Jefferson Davis, is in these words:

Washington Aqueduct.
Begun A. D. 1853. President of the U. S.,
Franklin Pierce. Secretary of War,
——————. Building, A. D. 1861,
President of the U. S., Abraham Lincoln.
Secretary of War, Simon Cameron.

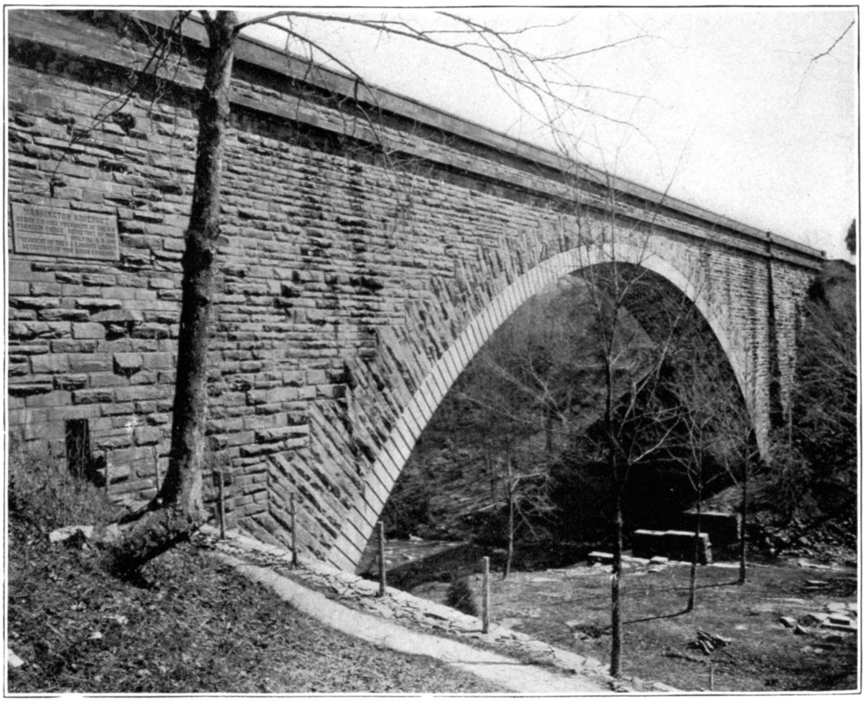
Captain Meigs, being apprehensive lest some action might be had looking to his removal as engineer in charge of the aqueduct, and desiring to perpetuate his own name as chief engineer of the bridge, caused the following inscription to be cut, in deep, imperishable letters, upon two of the arch or ring stones near the east abutment:

M. C. MEIGS,
Chief Engineer, Washington Aqueduct,
A. D. 1859. *Fecit.*

This was done before the tablets in the east and west abutments had been placed in position, and at a period



View Showing Army Wagon Train Standing on the Arch.
Winter of 1864-'65.



Completed Bridge. At the Left can be seen the Tablet from which the Name of Jefferson Davis was Erased.

shortly before he was relieved and ordered to Fort Jefferson. His motive apparently was to have the fact indelibly placed on record that he alone was engineer of the noble structure and to him should be given the credit.

In connection with the subject of erasure, there is another interesting historical fact worthy of notice, which I relate substantially as I have often heard it from Mr. Curtis and Mr. Hutton:

Between July, 1860, and February, 1861, a period of only six or seven months, Captain Meigs was absent as above stated, and during this time Captain Henry W. Benham and Lieutenant James St. C. Morton were in charge of the work. An examination of the photographs in my possession, which were taken during the progress of construction, will show that the work on the bridge at this time (July, 1860) was very much advanced. However, during the short period of his supervision, Lieutenant Morton had his own name, as well as that of Captain Benham, cut on the face of two of the arch stones immediately under those bearing the inscription placed there by Captain Meigs, and designating themselves as chief engineers. On his return in February following, Captain Meigs, observing what had been done, gave orders to have their names erased (which was done), contending that it was improper to have their names appear on the bridge as chief engineers, especially as the work performed by them during his absence was simply a continuation of his projects and plans, which had received the approval of Congress. (12 Stats., 106.)

A short time thereafter Captain Meigs had the large tablet in the east abutment placed in position, and caused the following inscription to be cut thereon:

UNION ARCH,
Chief Engineer, Captain Montgomery
C. Meigs, U. S. Corps of Engineers.
Esto perpetua.

It has been stated that, in recognition of the engineering genius of his assistant engineer, Mr. Alfred L. Rives, it was the intention of Captain Meigs to have his name appear on this tablet with his own, and that he had proceeded so far as to have the name of Mr. Rives traced thereon preparatory to cutting it in; but at this juncture Mr. Rives resigned and went south, and as a result the wording was changed, and the above inscription was cut thereon with the name of Mr. Rives omitted.

The origin of the title "Cabin John" as applied to the creek, and likewise to the bridge which spans it, is somewhat shadowy and traditionary. There is a story or legend that at an early date in the century a mysterious character occupied a rough cabin on the banks of the creek, a short distance above the present site of the bridge. The only name he was known by was "John"; sometimes he was spoken of as "John of the Cabin", and also as "Captain John". Upon some of the old records of Montgomery county, Maryland, the name of this creek is given as "*Captain* John". The present name, Cabin John, is either a corruption of "Captain John" or was derived from "John of the Cabin". He is stated to have led the life of a hermit, fishing in the streams and hunting in the neighboring forests being his only means of subsistence. It is said that at a subsequent period, many years ago, he mysteriously disappeared, and nothing was ever known as to his fate. During the days of slavery the old negroes of the vicinity claimed that the ghost of "Cabin John" was often seen by them near his lonely and deserted cabin.

After the erection of the bridge it was commonly known as Cabin John, taking its name from the creek it spanned, although it is specified upon the records as "Union Arch," and is so inscribed upon the tablet on the east abutment.

The history relating to this wonderful bridge and the incidents connected with its construction I have heard so often from the lips of my father that I love to revisit the scene, view its noble span, and recount the many days when but a child I watched its progress. It seems as yesterday, yet in the meantime many of those connected with its construction have passed away.

The years roll by, but the bridge is as solid and as immovable as the everlasting hills, and, as so aptly inscribed on the abutment, *esto perpetua*—it will last forever, and remain for the eyes of generations yet unborn a monument to the genius and inspiration of its engineer, Montgomery C. Meigs. Nor will time obscure or belittle the glory achieved by the mind that conceived its graceful lines, or the credit due to the assistants who directed its construction with so much precision and detail that not a stone has moved or settled to mar its beauty, symmetry, or strength.*

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* I am indebted to Prof. W J McGee, Ethnologist in charge of the Bureau of American Ethnology, for several of the photographs exhibited by me showing the bridge during its construction. The negatives have been preserved and are now on file in said Bureau.

Through the courtesy of General A. W. Greely the writer has been able to obtain several interesting photographs of the bridge.